

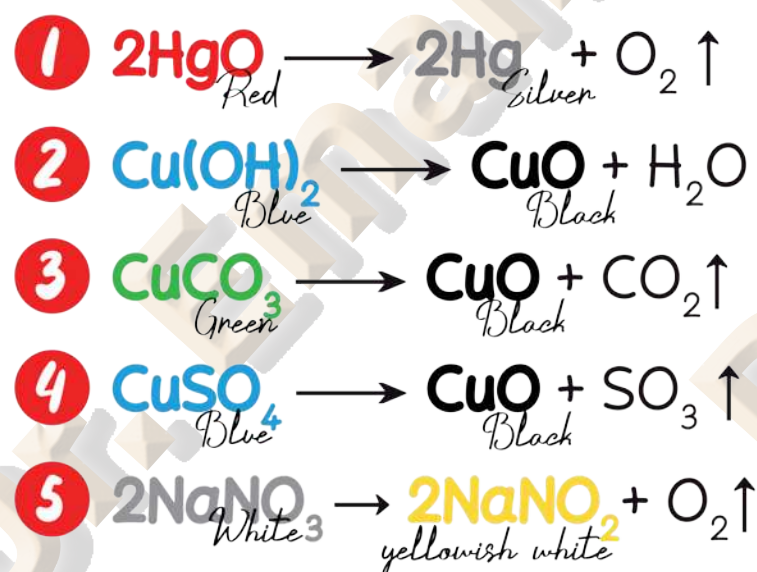


Types of reactions



Thermal decomposition reactions

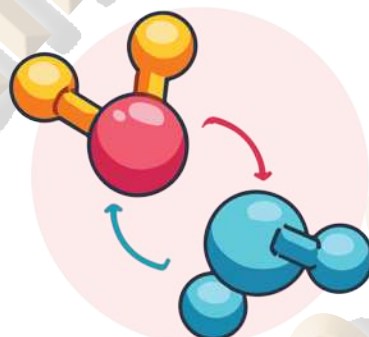
Reactions, where a compound is broken by heating into a simpler compound or into its elements



Note Carbon dioxide gas evolved which turbid clear limewater

Note Oxygen gas evolved which Increase the glow of burning match

In car crashes, sodium azide rapidly decomposes into sodium and nitrogen gas, which inflates the airbag



Substitution reactions

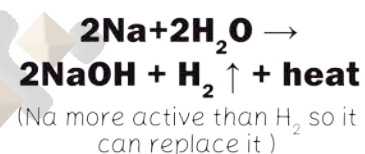
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occurs when there is an active element replace another less active element in their compound according to the chemical activity series

Elements **above** hydrogen in the series replace

Elements that **follow** hydrogen not replace hydrogen

1 Simple substitution reactions



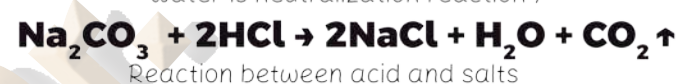
Hydrogen gas evolves with pop sound



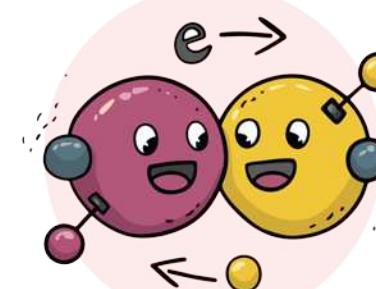
2 Double substitution reactions



(the reaction of acid and base to form salt and water is neutralization reaction)



K	Potassium
Na	Sodium
Ba	Barium
Ca	Calcium
Mg	Magnesium
Al	Aluminium
Zn	Zinc
Fe	Iron
Sn	Tin
Pb	Lead
H	Hydrogen
Cu	Copper
Hg	Mercury
Ag	Silver
Pt	Platinum
Au	Gold



Oxidation & Reduction reactions

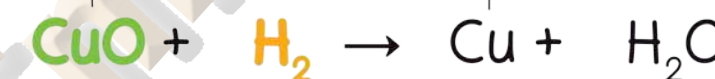
Traditional concept

Reduction

A reaction where hydrogen percentage is increased or oxygen percentage is decreased

Oxidizing agent

A substance which gives oxygen or gains hydrogen in reaction



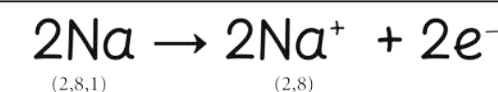
Reducing agent

Is a substance that gains oxygen or give hydrogen in a chemical reaction

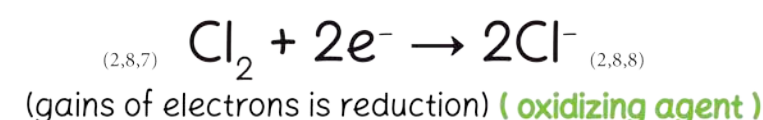
Oxidation

A reaction where oxygen percentage is increased or hydrogen percentage is decreased

Electronic concepts



(loss of electrons is oxidation) (reducing agent)



(gains of electrons is reduction) (oxidizing agent)

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1

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The speed of chemical reaction

It is the change in concentration of reactants and resultants in a unit time



Decomposition of nitrogen pentoxide N_2O_5

Beginning of reaction

The concentration of N_2O_5 is 100%, where the concentration of O_2 and NO_2 is 0%.

During reaction

the concentration of N_2O_5 decreases while the concentration of O_2 and NO_2 increases

End of reaction

N_2O_5 become 0% and the concentration of resultants become 100%.



Addition of sodium hydroxide solution to copper sulphate solution



The speed of this reaction can be measured by

The disappearance rate of the blue copper sulphate (reactant)
The appearance rate of the blue ppt of copper hydroxide (product)

Enzyme

It is a chemical substance is produced inside living organisms as a catalyst which increases the biological reactions

Example

Oxidase enzyme in sweet potato acts as a catalyst and increase the rate of decomposition of H_2O_2



Note

The biological reactions occur in the presence of enzymes rapid more than thousands time than without enzymes.

Factors affecting chemical reaction speed

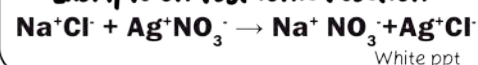


The nature of reactants

A-The kind of bonding of reactants

- Covalent compounds react slowly (bec, the reaction between molecule)
- Ionic compounds react fast (bec, the reaction between ions)

Example on fast ionic reaction



B-Surface area exposed

by Increasing the surface area of reactants the speed of reaction increase



the reaction of iron filling (more surface area) with hydrochloric acid is faster than that of piece of iron (less surface area)



temperature of the reaction

Increasing the temperature increases the rate of chemical reaction because the number of collisions between molecules increase

Note

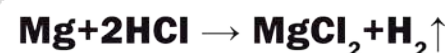
Bacteria spoil food through chemical reactions. That's why food is cooled or frozen to slow the rate of this reaction & stop spoiling



concentration of reactants

As concentration of the reactant increases, speed of reaction increases. Bec, more collision between molecules take place

Example

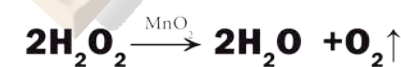


The reaction of conc HCl with Mg is faster than the reaction with dil HCl



Catalyst

A substance which speeds up the chemical reaction without changing or being used up



Adding MnO_2 (catalyst) speed up the reaction

Note

The Quantity (Mass) of catalyst Don't Change Before Or After Reaction

The catalyst Decrease The Energy Needed For Reaction

Catalytic converter

It is a metallic can exists in cars to treat the harmful gases emitted from the engine



Sodium bicarbonate Uses in our life

In the vacuum cleaner bag to get rid of the smell of dust.

In the bottom of the waste basket before putting the bag to prevent bad odors.

In polishing metals

In the garden ,help in the disappearance of ants

Soak the legumes in water with Na_2CO_3 To help in decreasing the bloating that accompanies eating of legumes.



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Electric current

It is the flow of negative charges (electrons) in a conducting substance (metal wire) (electric current generated in electric current station)



Current intensity

Quantity of electric charges flowing through a cross section of the conductor in one second.

$$\begin{array}{c} Q \\ I \end{array} = \frac{\text{quantity of charge (C)}}{\text{time in second (s)}}$$

coulomb
Ampere
Second

Ammeter

The instrument used to measure the current intensity (connected in series)



Ampere

It is the current intensity when 1 coulomb of charge passes through the cross section of the conductor in one second.

Coulomb

It's the charge transferred by a constant current of one ampere in one second.

Note

The electric intensity is: Directly proportional to the quantity of charge Inversely proportional to the time



Potential difference

It's the work done to transfer a quantity of electric charge between the two ends of this conductor

$$\begin{array}{c} W \\ V \end{array} = \frac{\text{work (Joule (W))}}{\text{Quantity of charge (C)}}$$

Joule (W)
Volt
Coulomb

Volt

It's the potential difference between the two poles of a conductor where 1 joule is done to transfer 1 coulomb of charge.

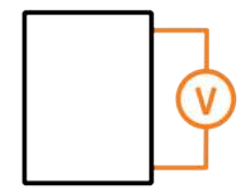
(Electromotive force (e.m.f

Electric potential difference between the two poles of the battery when the electric circuit is open (its measuring unit is volt)

Voltmeter

the device that measures potential difference (when the circuit is closed) & electromotive force (when the circuit is opened)

• Connected in parallel



Electric resistance

The obstruction to the flow of the current in the electric circuit.

Note

It's measured by an instrument called ohmmeter and the unit is ohm

Resistance types

Resistance has 2 types:

Fixed



Variable (Rheostat)



Rheostat

It is used to control the electric current intensity and potential difference

As by increasing the length of the wire, the resistance increases & current intensity decreases and vice versa

The variable resistance

It is the resistance that you can change in order to adjust the value of the current intensity and the potential difference

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Ohm's law

Relation between electric current intensity & potential difference

Current intensity is **directly proportional** to the potential difference across the ends of the conductor at constant temperature.



Electric resistance of a conductor

the ratio between potential difference between the two ends of a conductor & current intensity passing through it

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Note

we use the device (electric transformer to reduce the electric potential of the electric sources) to match the electric potential of some electric appliances in our homes

It's the potential difference between the two poles of a conductor whose resistance is one ohm & the current intensity is one ampere.

volt

$$\text{Electric resistance (}\Omega\text{)} = \frac{\text{potential difference (V)}}{\text{current intensity (A)}}$$

ohm Ampere

It is the resistance of a conductor which allows passing an electric current intensity of one ampere when the potential difference between its terminals is one volt.

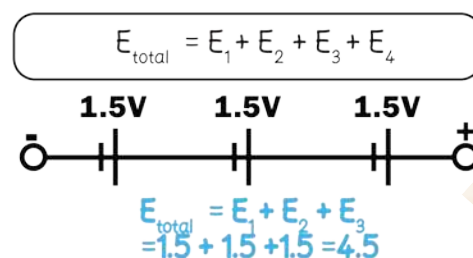
It's the current intensity in a conductor whose resistance is one ohm & its potential difference is one volt.

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Calculating Emf

Cells are connected in the circuit by 2 methods

Connecting cells in series
the sum of e.m.f of all the cells

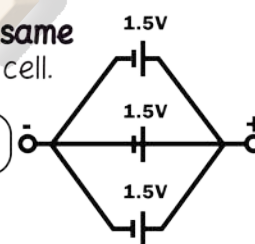


Connecting cells in parallel

If the cells have the same e.m.f = emf of one cell.

$$E_{\text{total}} = E_1 \text{ or } E_2 \text{ or } E_3$$

$$E_{\text{total}} = E_1 = E_2 = E_3 = 1.5$$



Source of electric current

Electric Generator

Change the Kinetic energy (mechanical) into electric energy

Defination

Dynamo (generator)

Example

Alternating current

Produced electric current

Electrochemical cell

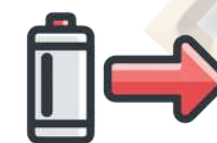
Change the chemical energy into electric energy

Dry cells - Batteries

Direct current

Types of electric current

Direct current



Alternating current

has constant intensity

Intensity

has variable intensities

Electrochemical cells

Source

Electric generator (Dynamo).

Its unidirectional

Direction

It has variable direction.

It's transferred over short distances only

Transference

Can be transferred over short & long distances.

Operating some electric machines
Electroplating

Uses

Lighting houses & streets & operating electric appliances

Can't be converted into alternating current

Conversion

Can be converted into direct current

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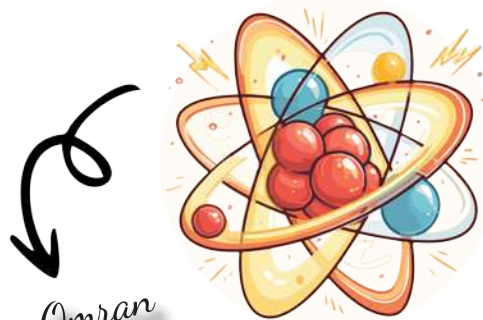
4

Preparatory 3



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The nuclear binding energy

Overcoming the repulsion forces between positive protons.

Binding the nucleus components together.

inside the nucleus

Radioactive elements

They are elements whose atoms' nuclei contain a number of neutrons more than the number required for its stability

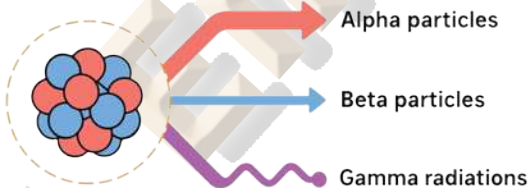
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Examples

Radium, Cesium, Selenium, Polonium, Zirconium, Rubidium

Note

The atom's nuclei of radioactive elements emit: Invisible radiations as **Alpha particles**, **Beta particles**, **Gamma radiations** automatically. To get rid of the excess energy to achieve a more stable composition



Radioactivity

Discovered by Henry Becquerel

Natural radioactivity

The spontaneous decaying of the atom's nuclei of some elements that are present in nature in an attempt to achieve a more stable composition



Artificial radioactivity

It is the radiation or nuclear energy that is released during nuclear reactions either from nuclear reactors (safe, can be controlled) or from nuclear bombs. (Can't be controlled)

Peaceful uses of nuclear energy

- 1 Medical field
- 2 space exploration
- 3 Agricultural field
- 4 Petroleum drilling
- 5 Generating electricity
- 6 Industrial field

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Radiation pollution

It is the increase in the amount of radiation in the environment

Natural Pollution

- a) Natural radioactive materials found on the Earth's surface.
- b) Cosmic radiation



Artificial Pollution

- They take place due to :
- a) The explosion of nuclear bombs.
 - b) The nuclear reactors

Radiation exposure

Large doses -short time

- 1 Damage of the bone marrow, spleen, the digestive system and the central nervous system.
- 2 The damage of The bone marrow cause the reduction of red blood cells

Dangers



Small doses -long period

- 1 **Physical effect:**
Change that appear on the living organism (like skin cancer)
- 2 **Cellular effect:**
Change in cell structure
The chemical composition of hemoglobin changes became incapable to carry oxygen.
- 3 **Genetic effect:**
The change in the sex chromosome composition (abnormal births)

The safe dose of nuclear radiation

- a. For radiologists is 20 mille Sievert per year.
- b. For public is 1 mille Sievert per year.

Protection from radiation



- 1 Radioactive wastes should be stored away from underground water resources to prevent their pollution
- 2 Away from lands & caves to prevent pollution from reaching animals
- 3 Stored in a stable area away from volcanoes & earthquakes
- 4 The worker with radioactive elements should wear protective gear (gloves, suits & masks).
- 5 Burying of nuclear wastes according to the radiation power :
 - Mild and moderate waste surrounded by a cement layer
 - Strong waste buried deeply in the ground

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Reproduction

all living organisms perform **reproduction**



produce new individuals which resemble the parents due to the transmission of genetic traits



Hereditary traits

They are the traits that are transmitted from one generation to another
Ex. hair color, skin color



Acquired traits

they are the traits that aren't transmitted from one generation to another
Ex. playing football & writing

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Genetics

It is a science that researches the transmission of the hereditary traits from one generation to another by studying the similarities and differences between the parents and the offspring.



Gregor Mendel

founder of hereditary

Started experiments on pea plant, because



- 1 It is easy to plant the pea plant and it grows fast, its life cycle is short
- 2 can easily be artificially pollinated
- 3 Its flowers are hermaphrodite
- 4 it produces large numbers of plants in a generation
- 5 It has several pairs of contrasting traits

Mendel experiment

studying the seed color of pea plant

- 1 **Making sure of pea plants purity for this trait**
By making self-pollination for many generation to pea plant with yellow seed and green seed
- 2 **Removal of the stamens from the flowers**
To prevent self-pollination.
- 3 **Making cross-pollination**
- 4 **Then he covered the stigma**
To prevent cross pollination again.

The result :

- The first generation 100 % yellow
- The second generation: 75% yellow (Dominant trait) : 25% green (Recessive Trait)

The principle of complete dominance

The appearance of a hereditary trait in the individuals of the first generation when two individuals crossed and one of them is carrying a pure hereditary trait contrasting the trait carried by the other individual

	Flower Colour	Plant Height	Seed Color	Seed Shape	Pod Colour	Pod Shape	Flower Position
Dominant Trait	purple	tall	yellow	Round	green	inflated	axial
Recessive Trait	white	short	green	wrinkled	yellow	Constricted	terminal

Dominant Trait

It is the trait that appears when aggregation of two similar factors of the dominant trait, or one dominant and one recessive trait.

Recessive Trait

It is the trait that appears only when aggregation of two similar factors of recessive trait.

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Mendel's first law The law of segregation

Mating 2 individuals with contrasting traits results in the appearance of the dominant trait alone in the first generation. In the second generation both traits appear & the ratio between the dominant trait & the recessive one is 3:1

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Pure individual

It is the individual that carries a similar pair of genes (factors) either dominant trait or recessive trait

Ex: YY (pure dominant) or yy (pure recessive)



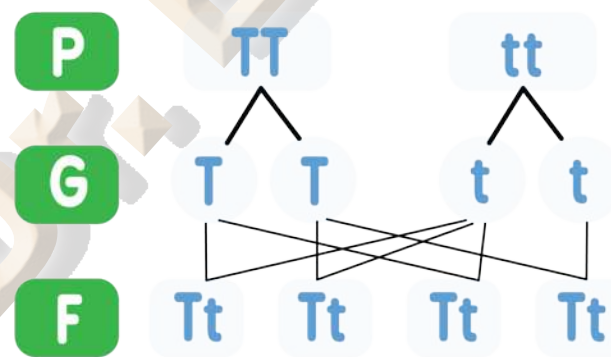
Hybrid individual

It is the individual that carries a different pair of genes (factors), one is dominant and the other is recessive

Ex: Yy (hybrid) dominant trait appears on the individual

Example

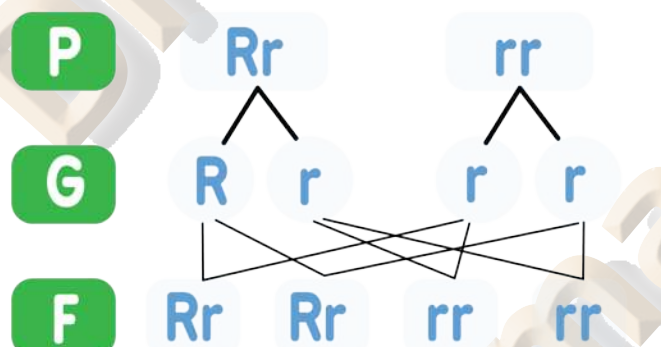
On pollinating two pea plants, all the produced plants are hybrid tall stem. Explain on the bases of genetic principles



%100 tall stem flower

Example

If crossing takes place between two pea plants, one of them with red flowers and the other with white flowers, this crossing produces .50 % hybrid red flowers : 50 % white flowers

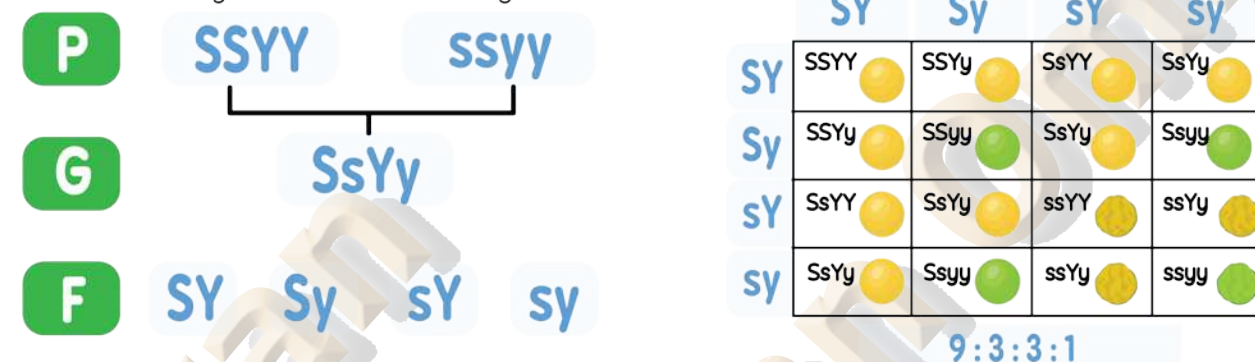


%50 Hybrid red flower %50 pure white flower

Mendel's second law independent assortment of hereditary factors

When two pure different individuals bearing two pairs or more of alternative (contrasting) traits are crossed, the trait of each pair is inherited independently of the others and appears in the second generation at a ratio of 3 (dominant trait): 1 (recessive trait)

Smooth yellow seed Wrinkled green seed



dominant & recessive traits in humans

Recessive

Can't roll tongue

Connected ear lobes

Straight hair

Colored eyes

Narrow eye

Absence of dimples

A face with freckles

Dominant

The ability to roll the tongue

Separate ear lobes

Curly hair

Brown eyes

Wide eyes

Presence of dimples

A face without freckles

Tongue

Ear lobe

Natural hair

Eye colour

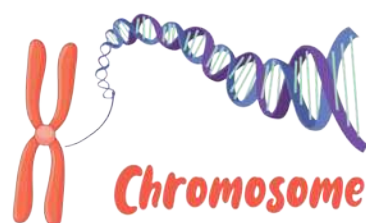
Size of eye

Check dimples

Freckles

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Chemical structure
(of nucleic acid (DNA



DNA wrapped around a histones
Genes Segments of DNA
Nucleotides exist in the form of double helix

Note

Watson and Crick make a Model of the DNA molecule

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The role of genes in expression of hereditary traits by Badel and Tatum

each gene produce Special Enzyme → this enzyme is responsible for a chemical reaction → Produce a protein that expresses a Specific hereditary trait

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7

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Endocrine glands

Ductless glands which secrete hormones directly into the blood
Where the blood carry **hormones** to the **targeted organ**



Hormones

They are chemical messages that regulate the biological functions in living organisms.

Targeted organs

They are the cells that the hormones affect and they are almost located a way from the endocrine gland that secretes the hormone.

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Two testes

testosterone hormone.

responsible for the appearance of the male secondary sex characters.

Two ovary

Estrogen hormone

responsible for the appearance of the female secondary sex characters.

Progesterone hormone

promotes the growth of endometrium

Hormone disorder

It is the increase or decrease in the secretion of one of the hormones, when the endocrine gland that secretes it doesn't act properly.

Diseases resulted from hormones disorders in human body

Dwarfism

Decrease in the secretion of the growth hormone at the childhood (**the person becomes dwarf**)

Gigantism

Increase in the secretion of the growth hormone at the childhood. (**the person becomes a giant.**)

Simple Goiter

Decrease in the secretion of the thyroxin hormone due to the lack of iodine from food.
(**Enlargement of thyroid gland and the neck.)**

Exophthalmic Goiter

Increase in the secretion of the thyroxin hormone in large amounts.
• (**Enlargement of thyroid gland**)
• (**Loss of weight, tension and exophthalmoses**)

Diabetes

Due to the decrease in the secretion of the insulin hormone.

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Gland

Hormone

Importance

Pituitary gland (master gland)

(located below the brain)
(It secrets hormones that regulate the activities of most of other endocrine glands.)

Growth hormone

It controls the speed of growth rate of body-muscles, bones and other organs.

Thyroid stimulating hormone

Activating the thyroid gland to release its hormones.

Activating hormones of sexual glands

Regulates growth and development of sex organs

Adrenal gland activating hormone

Activate the two adrenal gland to secrete adrenaline hormone

Mammary gland activating hormone

Activate the mammary gland to secrete milk during breast feeding

Thyroid gland

(located in the front surface of the neck on both sides of the trachea)

Thyroxin hormone

It plays a main role in food assimilation process to liberate the needed energy

calcitonin

Control the calcium level in blood.

Two adrenal gland

(located adhering to the top of kidney)

adrenalin hormone

Adrenalin stimulates body's organs to respond to emergencies like : fear, anger and emotion

Pancreas

(located between the stomach and the small intestine.)

Insulin hormone

It reduces the level of sugar in blood By:
(Store glucose in liver in form of glycogen (use glucose as a source of energy.)

Glucagon

It raises the level of lucose sugar in blood By:
(Convert the stored glycogen into glucose sugar)

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8

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امسح الباركود بالمويل لتثبيت
التطبيق وتحميل كل الملازم مجاناً وبسرعه



حمل التطبيق الآن



كورسات ونتائج امتحانات



ملازم ثانوي



ملازم اعدادي



ملازم ابتدائي



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